*Scopus* 26: 1-9, January 2007

# Blue Swallow *Hirundo atrocaerulea* in Kenya: status survey and conservation options



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Blue Swallow *Hirundo atrocareaulea* is endemic to sub-Saharan Africa and is an intra-African migrant (Turner & Rose 1989). In southern Africa, it breeds in eastern South Africa, north-western Swaziland, eastern Zimbabwe and adjacent Mozambique. In eastern Africa, it breeds in northern Malawi, north-eastern Zambia, south-eastern Democratic Republic of Congo (DRC) and south-western Tanzania (Evans *et al.* 2002). In the non-breeding season Blue Swallows migrate from throughout their breeding range to southern Uganda, western Kenya, north-eastern DRC and north-western Tanzania but do not breed there (Earle 1987).

The primary habitat on the breeding range is a combination of highland grassland interspersed with drainage lines in gullies and valleys and other wetland areas such as pans and small dams (Keith *et al.* 1992). In the non-breeding range the primary habitat includes moist grasslands in Kenya and seasonally flooded edges of permanent wetlands in Uganda (Nasirwa & Njoroge 1996; Evans *et al.* 2002). These habitats are disappearing rapidly and parts of the range have undergone profound changes leading to a major decline in numbers. Blue Swallow is therefore classified as globally Vulnerable (BirdLife International 2006). The East African population is classified as Endangered according to regional criteria (Bennun & Njoroge 1996).

Blue Swallows visit the open grasslands of western Kenya in the non-breeding season between April and September (Zimmerman *et al.* 1999). These pockets of grassland are disappearing fast in Kenya. Updated information on the status of the species in Kenya and the sites where it is found has, however, been lacking. Conservation efforts for the species in Kenya have been minimal with only a single one-day survey undertaken (Nasirwa & Njoroge 1996) prior to the one reported here.

In this paper, the conservation of Blue Swallow in its Kenyan non-breeding grounds is addressed by: (1) presenting the results of a recent rapid survey of the Blue Swallow and its habitat in Kenya, and (2) exploring realistic conservation options for the species in Kenya, mainly based on the experience gained from the survey and by referring to the International Blue Swallow Action Plan (Evans *et al.* 2002). The rapid survey was specifically aimed at estimating the number of Blue Swallows that winter on the Kenyan sites; estimating the current extent, quality and rate of loss of Blue Swallow habitat in Kenya; and identifying specific threats facing the species in Kenya.

## Study Area

Ruma National Park and Busia Grasslands are the two Kenya Important Bird Areas (IBAs) where Blue Swallow is known to occur. Both sites have been described by Bennun & Njoroge (1999, 2001). Ruma National Park is situated 10 km east of Lake Victoria in western Kenya. It lies on the flat floor of the Lambwe valley. The terrain is mainly rolling grassland, with tracts of open woodland and thickets dominated by species of *Acacia* and *Balanites*. A variety of mammals occur in the park but the most notable is Roan Antelope *Hippotragus equinus*, a rare species in Kenya. The surrounding area is settled, with a mix of small-scale cultivation and grassy pasture. The surrounding population density is high, but people and their livestock avoid the Ruma area because of the presence of tsetse fly. It is the only protected area in Kenya where the Blue Swallow is regularly recorded.

Busia Grasslands is a chain of small patches (some seasonally flooded) in western Kenya to the east of Busia town. Nasirwa & Njoroge (1996) identified some of the patches (Matayo, Mungatsi, Malanga and Sikoma) while the rest were identified from information provided by local people (Karungu/Madende, Nambale Bridge, Walawatsi river, Musokoto, and Kiseka). Additional small patches (<0.5 ha) may be found elsewhere in the Busia District, especially along the river valleys. All these patches are surrounded by intensive agriculture, mainly maize and sugarcane, and are grazed by livestock. They are under severe and immediate threat due to pressure from the large, rapidly increasing human population.

## Methods

The survey took place between 27 August and 5 September 2003, at a time when the Blue Swallow is found in western Kenya as a non-breeding visitor (Zimmerman *et al.* 1996). In Ruma National Park the swallows were searched for and counted within 16 belt transects (0.2 x 2.0 km each) by driving along access roads within the park at an average speed of 15 km $h^{-1}$ whilst three observers counted from the back of the open vehicle. 15 of these transects were counted twice. In Busia, swallows were searched for in grassland patches and counted by observers walking 22 transects (0.2 x 0.5 km each) with nine of these transects being counted twice. All Blue Swallows and other hirundines seen along these transects were counted. The group size and composition (adult or juvenile/immature based on tail streamer length) of Blue Swallows was recorded. For perching birds, the perch type and height was recorded.

Estimates were made of the Blue Swallow populations in the study sites by extrapolating the observed densities of Blue Swallows along transects into the area of suitable habitat in the study sites. The 95 % confidence interval was used to express the expected variation of the average density. Repeat counts were made on separate days and were treated as statistically independent samples due to the high mobility of the birds, which ensured that counts obtained on the same transect visited on different days were not correlated

with each other. For the calculation of population densities, the number of sampled transects in Ruma and Busia was therefore 31 in each case (16 + 15 and 22 + 9, respectively).

Sample plots (radius = 50 m) spread throughout the study sites, some chosen randomly and others located where Blue Swallows were recorded, were assessed for various vegetation and topographical variables including: % cover of grassland, other habitat types and any human land use practices (e.g. cultivation); grass height at four points; grazing intensity (rated using a score of 0–3); presence of grazing species; intensity of woody species (rated using a score of 0–3); dominant woody and grass species; and slope. A digitised map of Ruma National Park (Spranger *et al.* 2003) was used to estimate current vegetation cover in the park. Potential threats to the species and its habitat were recorded. In Busia, opportunistic contacts were made with local community members present in the areas visited during fieldwork. In Ruma National Park, the research team met rangers on duty, and also scheduled a meeting with the Warden.

## Results

### *Grassland extent*

In Ruma National Park open or sparsely wooded grasslands covered 68 % (*c.* 8850 ha) of the park while forest, woodlands and thickets covered the remaining 32 % (*c.* 4250 ha). Approximately 1450 ha of the grasslands in the park were unlikely to be seasonally flooded or wet as they were located on steep areas of the Kanyamaa escarpments in the southeast and southern end of the park. As such, wet grasslands covered *c.* 7400 ha. Areas outside the park were densely populated by humans and were often cultivated, even heavily so, providing little habitat for Blue Swallows. In Busia, grasslands occurred in patches of varying sizes (Table 1), with a total grassland area of *c.* 230 ha. Only 36 % of the area falling within our belt transects in Busia was covered with grassland.

### *Bird counts and population estimates*

In Ruma National Park, Blue Swallows were recorded within five of the 16 belt transects during the first set of counts. During the second set of counts, they were recorded within only two of the same transects in which they had initially been recorded in the first set of counts. A total of 72 birds were seen, 42 on the first count and 30 on the second. A mean density (± SD) of 0.06 ± 0.13 birds $ha^{-1}$ (n = 31) was recorded for the entire area sampled in the park. The birds were patchily distributed within the park, and occurred in relatively high densities at localities where they were detected. Within transects in which Blue Swallows were recorded a maximum and minimum density of 0.5 birds $ha^{-1}$ and 0.1 birds $ha^{-1}$ were recorded respectively.

In the Busia Grassland fragments, Blue Swallows were encountered within four of the 22 transects that were counted, with the first two encounters

**Table 1**. Status of sites surveyed for Blue Swallow in western Kenya.

| Site | Lat, Long | Altitude (m) | Wet grassland area (ha) | No. of Blue Swallows seen | Threats |
|---|---|---|---|---|---|
| Ruma N. Park | 00°35'S, 34°12'E | 1200- 1600 | 7400 | 72 | Food crop cultivation, burning |
| Busia | | | | | |
| (i) Karungu/Madende | 00°28'20"N, 34°21'02"E | 1234 | 8 | 0* | Drainage, food crop cultivation, settlement |
| (ii) Mungatsi | 00°28'01"N, 34°19' 40"E | 1213 | 5 | 0* | Sugar cane cultivation |
| (iii) Walawatsi river | 00°29'29"N, 34°18'48"E | 1201 | 15 | 0 | Food crop cultivation, bush encroachment |
| (iv) Nambale bridge | 00°27'08"N, 34°15'28"E | 1186 | 1 | 0 | Sugar cane cultivation |
| (v) Musokoto (along Musokoto river) | 00°29'16"N, 34°18'17"E | 1212 | 18 | 8 | Food crop cultivation, bush encroachment, exotic tree plantation |
| (vi) Kiseka (Mzee Lino's farm) | 00°28'39"N, 34°16'15"E | 1197 | 25 | 13 | Food crop cultivation |
| (vii) Sikoma (along Lelekwe river) | 00°23'53"N, 34°17'04"E | 1209 | 6 | 0* | Food crop cultivation, overgrazing |
| (viii) Malanga (along Lelekwe river) | 00°25'25"N, 34°15'18"E | 1249 | 1 | 0 | Food crop cultivation |
| (ix) Matayos (along Sio river) | 00°23'11"N, 34°08'39"E | 1166 | 150 | 0* | Food crop cultivation, overgrazing, grass cutting, bush encroachment, burning, trapping, digging of dams |

* Sites where Blue Swallow was not seen but based on grassland extent and condition, it is predicted that they could be suitable sites visited by the species.

occurring during the first set of counts and the other two during the second set of counts. No transects had birds during both visits. A total of 21 birds were seen, 8 in the first count and 13 in the second. A mean density (± SD) of 0.07 ± 0.18 birds $ha^{-1}$ (n = 31) was recorded for the entire sampled area in Busia. As was the case in Ruma National Park, birds in Busia grasslands also seemed to occur patchily and at high densities within localities where they were encountered with a maximum and minimum densities of 0.7 birds $ha^{-1}$ and 0.1 birds $ha^{-1}$ respectively.

Blue Swallows were the second most abundant hirundine in Ruma after Barn Swallow *H. rustica*, but were third in Busia after Barn Swallow and Lesser Striped Swallow *H. abyssinica*. The total population for both Ruma National Park and Busia Grasslands was estimated to be *c.* 446 individuals, with specific estimates for Ruma N.P. and Busia Grasslands (± 95 % CI) being 430 ± 338 (n = 31) and 16 ± 14 (n = 31) individuals respectively.

### *Habitat*

Blue Swallows were only recorded in open grasslands and wooded grasslands. This is consistent with the observations of Msuha & Sutherland (2001) who found that Blue Swallows preferred areas with the fewest to no trees. They were absent in the non-grassland areas, e.g. cultivation and settlements. Grass height within transects where Blue Swallows were found ranged from 0.5 to 2.5 m (mean = 1.3 ± 0.3 m, n = 12). The height, however, did not differ significantly between the random transects where the swallows were absent and those where they were present (t-test, $p = 0.589$, d.f. = 40).

In Ruma National Park, Blue Swallows were seen within areas that were flat and entirely covered by sparsely wooded grasslands, with a low intensity of woody plants. Although most (69 %, n = 38) of the sampled transects were flat, a higher proportion (80 %, n = 10) of occupied transects were flat compared with unoccupied (66 %, n = 28). In Ruma *Acacia drepanolobium*, *A. xanthophloea* and *Balaenites aegyptica* were the main woody species that occurred within the transects in which the Blue Swallow was recorded, but the actual points where the birds were located (including one where two birds were observed casually) were all dominated by short (0.5–3.0 m tall) *A. drepanolobium* trees. The dominant grass species in transects where the swallow was recorded was *Themeda triandra* (Gramineae).

In Busia, all the Blue Swallows were seen within transects that were mainly covered by open grassland (70 %), but were interspersed with cultivation (20 %) and thickets (10 %). *Miscanthus violaceus* (Gramineae) was the dominant grass species at occupied localities in Busia.

### *Perching sites, group size and composition*

All the Blue Swallows that were seen perching in the Ruma National Park (n = 11) were sitting on short (mean height = 2.0 ± 0.5, n = 11), dry or leafless *A. drepanolobium* trees that stood just slightly higher than the mean grass height

in the area. Seven perching Blue Swallows seen in Busia were sitting on tall (1.5–3 m) stands of the grass *M. violaceus* at a mean height of 1.5 m above the ground.

The birds were seen in groups of 2–7 birds (mean = 4, n = 10). In most cases the groups (n = 7) were mixed with Barn Swallows (n = 6), White-headed Saw-wing *Psalidoprocne albiceps* (n = 2) and Lesser Striped Swallow (n = 1). Mixed group sizes of 4–40 swallows were recorded. Juvenile/immature birds constituted 18 % of the birds that were observed during the survey.

*Distribution within sites*

At Ruma, Blue Swallows were only recorded within the park boundaries. They were recorded in the open but sparsely wooded rolling grasslands in the south-eastern part of the park, on the flat floor of the Lambwe valley, mostly on the southern side of the Olambwe River (most of the sightings were made on both sides of the road between the park airstrip and Wiga Gate). No Blue Swallow was recorded in the forest strip along the Olambwe River, the grasslands on the steep Kanyamaa escarpment on the far southeast of the park and the open grasslands in the northern-most part of the park, and cultivated areas outside the park.

In Busia, Blue Swallows were only recorded in a grassland patch in Kiseka, 2 km north of Nambale town and another patch along Walawatsi River, 3 km north of Mungatsi town (Table 1).

*Threats*

Most of the threats that the Blue Swallow faces on its Kenyan sites result from the loss of its habitat. Loss of grasslands immediately outside Ruma National Park is severe, and almost every available area is cultivated, heavily grazed or settled. Within the park, grazing is limited to wild animals and apparently does not go beyond the required level for persistence of Blue Swallows. Burning of grasslands was observed in a small part near the park airstrip. We, however, observed a group of Blue Swallows sallying over the burnt area. It is therefore possible that this patchy burning provides opportunities for sallying Blue Swallows to feed on swarms of insects flying over burnt patches. In fact, burning might also be an important management option in the long term, as it prevents the invasion of shrubs and trees.

Busia grasslands are found on privately owned land so the Blue Swallow faces more severe threats here (Table 2). Loss of grasslands was observed to be to the most common threat in Busia. The local people also reported trapping of swallows for food as a common practice.

## Discussion

The results of this study show that Ruma National Park is a stronghold for Blue Swallows visiting Kenya during the non-breeding season. This can be attributed to a lack of immediate threats within the park due to its

**Table 2.** Specific threats/issues in Busia and their relative importance for the conservation status of the species (low = * medium = ** high = ***).

| | |
|---|---|
| Food crop cultivation | *** |
| Sugar cane cultivation | *** |
| Burning | * |
| Drainage | * |
| Settlement | ** |
| Bush encroachment (had encroached up to 12 % of grassland area) | * |
| Planting of exotic tree plantation e.g. Eucalyptus | * |
| Overgrazing | ** |
| Grass cutting | * |
| Trapping of swallows for food | ** |
| Digging of fishing dams in flood areas | * |

protection by the Kenya Wildlife Service (KWS) and a large area of suitable habitat within the park. This contrasts with the chain of grassland fragments in Busia that are currently facing numerous threats because they are unprotected, small and continue to decrease in size. The result is that they support a small, and probably declining, Blue Swallow population. Compared with Nasirwa & Njoroge's (1996) survey some of the potential grassland fragments in Busia (e.g. Mungatsi) seem to have lost over 60 % of their grassland cover within the past decade.

It is possible that high diurnal movements between the grassland patches by Blue Swallows and the small number of counts made per transect and grassland patch greatly reduced the chance of observing Blue Swallows at some of the sites. It is also possible that Blue Swallows require more than the presence of grasslands. The grasslands also need to be moist (Msuha & Sutherland 2001). This could be a factor that contributed to the patchy distribution of the birds and occurrence in relatively high densities at localities where they were detected. Such patchy distribution makes population extrapolation difficult.

An optimum searchheight should exist for a predator foraging in a given height where the benefits of field vision size balance the costs of prey discrimination (Soobramoney *et al.* 2004). The selection of perching sites could therefore have been influenced by how well the sites offered a good view for sallying insects. The dry leafless *A. drepanolobium* (in Ruma) and the tall *M. violaceus* grass stands (in Busia) standing above the average grass height probably offered a wider unobstructed view of the surrounding ground whereas leafy trees impeded the view. If perching sites were utilized for providing a good foraging view, they did not necessarily need to be very high since the grassland vegetation was relatively low, thus probably explaining the observed low height of the Blue Swallow perch sites. In fact,

field observations in Ruma N. P. showed a high coincidence of Blue Swallow locations with *A. drepanolobium* trees, which were relatively less leafy and shorter, compared to other trees (*A. xanthophloea* and *Balaenites aegyptica*) found within the sparsely wooded grasslands in the park. I suggest that the importance of perch characteristics in explaining the local distribution of Blue Swallows be assessed further.

All the Blue Swallows were observed in relatively flat areas covered by grasslands. Flatter areas were more likely to be marshy, consistent with the observations of Msuha & Sutherland (2001) who found that Blue Swallows preferred marsh areas. Grassland cover and topography are therefore likely to be quite important factors in determining the local distribution of Blue Swallows.

### *Some conservation options for the Blue Swallow in Kenya*

The survey has confirmed that western Kenya still offers important non-breeding grounds for the Blue Swallow. The sites, especially in Busia, are however faced with serious threats and urgent interventions are necessary. Since the Blue Swallow habitat in Busia is found within privately owned land, any conservation approach will have to be integrated with development activities so that they are accepted by the landowners. Because Blue Swallows in Busia were seen within grasslands of *c.* 20 ha and as narrow as 200 m but lying along streams/drainage lines, plans to create reserves of grassland mosaics need not necessarily comprise one large contiguous piece of land, but possibly a chain of strategically selected, reasonably sized, grasslands along drainage lines.

Since Blue Swallows are intra-African migrants, it is necessary that conservation activities within Kenya are well coordinated with those of other range countries. Further effort could be put into forming links with the existing organizations protecting the habitat of the Blue Swallow as well as the Africa Blue Swallow Working Group formed in 2002 (Evans *et al.* 2002).

**Acknowledgements**

Fauna and Flora International through the Flagship Species Fund Small Grants Programme, provided funding for this project. D. Gitau, O. Kioko, T. Mwinami and G. Okello provided invaluable assistance in field data collection. Kenya Wildlife Service (KWS) and private landowners kindly allowed the survey team to access the study sites. The Department of Ornithology, National Museums of Kenya provided equipment used in this survey.

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*Scopus* 26: 1-9, January 2007
Received 16 September 2005